CLAIMS

WHAT IS CLAIMED:

- 1 1. A method for contemporaneously utilizing seismic data in the pre-stack seismic
- domain and the post-stack seismic domain, comprising:
- initiating a higher order probe at a three-dimensional coordinate in a post-stack
- seismic volume; and
- 5 instantiating a pre-stack seismic data content for the higher order probe.
- 1 2. The method of claim 1, wherein initiating the higher order probe from the three-
- dimensional coordinate includes initiating the higher order probe at a trace location in the
- 3 post-stack seismic volume.
- 1 3. The method of claim 2, wherein the trace location comprises a binning location.
- 1 4. The method of claim 3, wherein the binning location comprises one of a common
- 2 midpoint location, a common conversion point location or a common image point location
- 5. The method of claim 2, wherein the trace location comprises a seismic navigation
- 2 location.
- 1 6. The method of claim 5, wherein the seismic navigation comprises one of a common
- 2 receiver location or a common shot location.
- The method of claim 1, wherein initiating the higher order probe from the three-
- 2 dimensional coordinate includes initiating the higher order probe at a velocity analysis
- 3 location in the post-stack seismic volume.
- 1 8. The method of claim 1, wherein initiating the higher order probe at the velocity
- analysis location includes initiating the higher order probe at a velocity update location in the
- 3 post-stack seismic volume.
- 1 9. The method of claim 7, wherein initiating the higher order probe at the velocity
- 2 analysis location includes providing a map of analysis locations.
- 1 10. The method of claim 7, wherein the analysis location comprises one of a common
- 2 midpoint location, a common conversion point and a common image point location.

- 1 11. The method of claim 7, wherein the velocity analysis location includes a Vp, a Vs or a
- Vp/Vs velocity analysis location.
- 1 12. The method of claim 1, wherein initiating the higher order probe from the three-
- dimensional coordinate includes selecting a type for the higher order probe.
- 1 13. The method of claim 12, selecting the type for the higher order probe comprises
- selecting one of a common midpoint gather, a common conversion point gather, a common
- image point gather, a common shot gather, a common receiver gather, a semblance panel, a
- 4 gamma scan and a focusing panel.
- 1 14. The method of claim 1, wherein initiating the higher order probe from the three-
- dimensional coordinate includes setting a multi-dimensional frame.
- 1 15. The method of claim 14, wherein setting the multi-dimensional frame includes
- 2 graphically setting the multi-dimensional frame.
- 1 16. The method of claim 14, wherein setting the multi-dimensional frame includes setting
- at least one of time window, depth window, offset/velocity range, offset/velocity scale, trace
- decimation, azimuths, and azimuth artificial reorientation.
- 1 17. The method of claim 1, wherein instantiating the higher order probe at the three-
- dimensional coordinate includes attaching the collective higher order probe to the three-
- 3 dimensional reference system.
- 1 18. The method of claim 17, further comprising:
- rotating, translating or zooming in or out the scene; and
- rotating, translating or zooming in or out the higher order probe with the scene.
- 1 19. The method of claim 1, wherein instantiating the higher order probe at the three-
- dimensional coordinate includes detaching the higher order probe from the three-dimensional
- 3 reference system.
- 1 20. The method of claim 19, further comprising manipulating the detached higher order
- 2 probe.

- The method of claim 20, wherein manipulating the detached higher order probe includes at least one of rotation, translation, rescaling, slicing, and setting visual attributes.
- 1 22. The method of claim 1, further comprising:
- initiating at least one secondary higher order probe at secondary three-dimensional coordinates in the post-stack seismic volume; and
- instantiating the secondary pre-stack seismic data content for the secondary higher order probe.
- The method of claim 22, wherein initiating the second higher order probe includes initiating a higher order probe independent of the first higher order probe.
- 1 24. The method of claim 22, wherein the first and secondary higher order probes 2 comprise a collective probe.
- The method of claim 22, wherein initiating the second higher order probe includes initiating a higher order probe dependent on the first higher order probe.
- 1 26. The method of claim 1, further comprising:
- slicing through the post-stack seismic domain; and
- automatically instantiating the higher order probe on each slice while slicing through the post-stack seismic domain.
- 1 27. The method of claim 1, further comprising:
- seeding with interpretation at least one of the pre-stack seismic domain and the poststack seismic domain; and
- spreading the interpretation in the other domain.
- 28. A program storage medium encoded with instructions that, when executed by a computer, perform a method for contemporaneously utilizing seismic data in the pre-stack
- seismic domain and the post-stack seismic domain, the method comprising:
- initiating a higher order probe at a three-dimensional coordinate in a post-stack seismic volume; and
- instantiating a pre-stack seismic data content for the higher order probe.

- 1 29. The program storage medium of claim 28, wherein initiating the higher order probe
- from the three-dimensional coordinate in the encoded method includes initiating the higher
- order probe at a trace location in the post-stack seismic volume.
- 1 30. The program storage medium of claim 28, wherein initiating the higher order probe
- from the three-dimensional coordinate in the encoded method includes initiating the higher
- order probe at a velocity analysis location in the post-stack seismic volume.
- 1 31. The program storage medium of claim 28, wherein initiating the higher order probe
- from the three-dimensional coordinate in the encoded method includes selecting a type for
- 3 the higher order probe.
- 1 32. The program storage medium of claim 28, wherein initiating the higher order probe
- from the three-dimensional coordinate in the encoded method includes setting a multi-
- 3 dimensional frame.
- 1 33. The program storage medium of claim 28, wherein instantiating the higher order
- probe at the three-dimensional coordinate in the encoded method includes attaching the
- 3 collective higher order probe to the three-dimensional reference system.
- 1 34. The program storage medium of claim 28, wherein instantiating the higher order
- 2 probe at the three-dimensional coordinate in the encoded method includes detaching the
- 3 higher order probe from the three-dimensional reference system.
- 1 35. The program storage medium of claim 28, wherein the encoded method further
- 2 comprises:
- 3 initiating at least one secondary higher order probe at secondary three-dimensional
- 4 coordinates in the post-stack seismic volume; and
- instantiating the secondary pre-stack seismic data content for the secondary higher
- 6 order probe.
- 1 36. The program storage medium of claim 28, wherein the encoded method further
- 2 comprises:
- slicing through the post-stack seismic domain; and
- automatically instantiating the higher order probe on each slice while slicing throught
- 5 the post-stack seismic domain.

- 1 37. The program storage medium of claim 28, wherein the encoded method further comprises:
- seeding with interpretation at least one of the pre-stack seismic domain and the post-
- 4 stack seismic domain; and
- spreading the interpretation in the other domain.
- 1 38. A computer programmed to perform a method for contemporaneously utilizing
- seismic data in the pre-stack seismic domain and the post-stack seismic domain, the method
- 3 comprising:
- 4 initiating a higher order probe at a three-dimensional coordinate in a post-stack
- seismic volume; and
- instantiating a pre-stack seismic data content for the higher order probe.
- 1 39. The computer of claim 38, wherein initiating the higher order probe from the three-
- dimensional coordinate in the programmed method includes initiating the higher order probe
- at a trace location in the post-stack seismic volume.
- 1 40. The computer of claim 38, wherein initiating the higher order probe from the three-
- dimensional coordinate in the programmed method includes initiating the higher order probe
- at a velocity analysis location in the post-stack seismic volume.
- 1 41. The computer of claim 38, wherein initiating the higher order probe from the three-
- 2 dimensional coordinate in the programmed method includes selecting a type for the higher
- 3 order probe.
- 1 42. The computer of claim 38, wherein initiating the higher order probe from the three-
- dimensional coordinate in the programmed method includes setting a multi-dimensional
- 3 frame.
- 1 43. The computer of claim 38, wherein instantiating the higher order probe at the three-
- dimensional coordinate in the programmed method includes attaching the collective higher
- order probe to the three-dimensional reference system.
- 1 44. The computer of claim 38, wherein instantiating the higher order probe at the three-
- dimensional coordinate in the programmed method includes detaching the higher order probe
- 3 from the three-dimensional reference system.

- 45. The computer of claim 38, in the programmed method further comprises: initiating at least one secondary higher order probe at secondary three-dimensional 2 coordinates in the post-stack seismic volume; and 3 instantiating the secondary pre-stack seismic data content for the secondary higher 4 order probe. 5 46. The computer of claim 38, in the programmed method further comprises: 1 slicing through the post-stack seismic domain; and 2 automatically instantiating the higher order probe on each slice while slicing through 3 the post-stack seismic domain. 4 47. The computer of claim 38, wherein the programmed method further comprises: 1 seeding with interpretation at least one of the pre-stack seismic domain and the post-2 stack seismic domain; and 3 spreading the interpretation in the other domain. 4 48. A method for contemporaneously navigating seismic data in the pre-stack seismic 1 domain and the post-stack seismic domain, comprising: 2 initiating a collective higher order probe at a plurality of three-dimensional 3 coordinates in the post-stack seismic volume; 4 instantiating a pre-stack seismic data content for the collective higher order probe; 5 slicing through the post-stack seismic domain; and automatically instantiating the collective higher order probe on each slice while 7 slicing through the post-stack seismic domain. 8 49. The method of claim 48, wherein initiating the collective higher order probe from the 1
- three-dimensional coordinates includes initiating the collective higher order probe at a plurality of trace locations in the post-stack seismic volume.
- The method of claim 48, wherein initiating the collective higher order probe from the three-dimensional coordinates includes initiating the collective higher order probe at a plurality of velocity analysis locations in the post-stack seismic volume.

- 1 51. The method of claim 48, wherein initiating the collective higher order probe at the
- velocity analysis locations includes initiating the collective higher order probe at a plurality
- of velocity update locations in the post-stack seismic volume.
- 1 52. The method of claim 48, wherein initiating the collective higher order probe from the
- three-dimensional coordinates includes selecting a type for the collective higher order probe.
- 1 53. The method of claim 48, wherein instantiating the collective higher order probe at the
- 2 three-dimensional coordinates includes attaching the collective higher order probe to the
- 3 three-dimensional reference system.
- 1 54. The method of claim 48, wherein instantiating the collective higher order probe at the
- 2 three-dimensional coordinates includes detaching the collective higher order probe from the
- 3 three-dimensional reference system.
- 1 55. A method for contemporaneously interpreting seismic data in the pre-stack seismic
- domain and the post-stack seismic domain, comprising:
- 3 initiating a higher order probe at a three-dimensional coordinate in a post-stack
- 4 seismic volume;
- instantiating a pre-stack seismic data content for the higher order probe; and
- 6 seeding at least one of the pre-stack seismic domain and the post-stack seismic
- 7 domain from the other.
- 1 56. The method of claim 55, wherein initiating the higher order probe from the three-
- dimensional coordinate includes initiating the higher order probe at a trace location in the
- 3 post-stack seismic volume.
- The method of claim 55, wherein initiating the higher order probe from the three-
- 2 dimensional coordinate includes initiating the higher order probe at a velocity analysis
- 3 location in the post-stack seismic volume.
- 1 58. The method of claim 55, wherein initiating the higher order probe at the velocity
- analysis location includes initiating the higher order probe at a velocity update location in the
- 3 post-stack seismic volume.

- The method of claim 55, wherein initiating the higher order probe from the threedimensional coordinate includes selecting a type for the higher order probe.
- 1 60. The method of claim 55, wherein initiating the higher order probe from the three-
- dimensional coordinate includes setting a multi-dimensional frame.
- 1 61. The method of claim 55, wherein instantiating the higher order probe at the three-
- dimensional coordinate includes attaching the collective higher order probe to the three-
- dimensional reference system.
- 1 62. The method of claim 55, wherein instantiating the higher order probe at the three-
- dimensional coordinate includes detaching the higher order probe from the three-dimensional
- 3 reference system.
- 1 63. The method of claim 55, further comprising:
- initiating at least one secondary higher order probe at a secondary three-dimensional
- coordinates in the post-stack seismic volume; and
- instantiating the secondary pre-stack seismic data content for the secondary higher
- 5 order probe.
- 1 64. The method of claim 55, further comprising:
- slicing through the post-stack seismic domain; and
- automatically instantiating the higher order probe on each slice while slicing through
- 4 the post-stack seismic domain.